

## APPENDIX B

### GLOSSARY

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#### 1. Glossary

##### -A-

**ALTERNATING CURRENT (AC).** Refers to an electrical system in which the supply voltage, and thus the current flowing is a load, alternates polarity at a specified frequency. Alternating current systems are typically supplied from rotating electrical generators.

**AVAILABILITY.** A measure of the degree to which an item is in an operable and committable state at the start of a mission when the mission is called for at an unknown (random) time. (Item state at start of a mission includes the combined effects of the readiness-related system reliability and maintainability parameters, but excludes mission time.) (MIL-STD-721C, now canceled). In its simplest definition, availability is uptime divided by downtime. In terms of reliability (MTBF or and maintainability (Mean Time to Repair or Mean Downtime), inherent and operational availability are defined as:

**A<sub>O</sub>.** Operational Availability. The percentage of time that a system is available for use based on its operational reliability and maintainability, and logistics factors, such as delay times. Usually defined by the following steady-state equation:

$$A_o = \frac{MTBM}{MTBM + MDT}$$

**A<sub>i</sub>.** Inherent Availability. The percentage of time that a system is available for use based only on its inherent reliability and maintainability characteristics. Usually defined by the following steady-state equation:

$$A_i = \frac{MTBF}{MTBF + MTTR}$$

##### -C-

**COAXIAL CABLE (COAX).** A cable construction in which a single copper conductor is insulated and then covered with a concentric braided copper shield which also serves as a current carrying conductor.

**COMMISSIONING.** The process of verifying and documenting that systems or equipment perform in accordance with their specifications and design intent.

**CONTROL SELECTIVITY.** The degree to which a control can be manipulated without accidentally activating other controls. A common problem is to position buttons or keys too closely, leading to the wrong button being pressed.

**-D-**

**DIRECT CURRENT (DC).** Refers to an electrical system in which the supply voltage, and thus the current flowing in a load, is fixed in polarity. Direct current systems are typically supplied from storage batteries.

**DIRECT DIGITAL CONTROL (DDC).** A control system used for electronic measurement and control of building HVAC systems.

**-E-**

**ELECTROMAGNETIC COMPATIBILITY (EMC).** The extent to which a piece of hardware will tolerate electrical interference from other equipment and will interfere with other equipment.

**ELECTROMAGNETIC INTERFERENCE (EMI).** Any spurious effect produced in the circuits or element of the device by external electromagnetic fields.

**ELECTROMAGNETIC PULSE (EMP).** Electromagnetic radiation from a nuclear explosion. The resulting electric and magnetic fields may couple with electrical/electronic systems to produce damaging current and voltage surges.

**ELECTROSTATIC DISCHARGE (ESD).** A transfer of electric charge between bodies at different electrostatic potentials caused by direct contact or induced by an electrostatic field.

**ENERGY MANAGEMENT SYSTEM (EMS).** In the commercial building industry, a control system designed to monitor and maintain environmental conditions by controlling heating, ventilation and air conditioning systems. In the electric utility industry, a control system designed to monitor and control power generation and transmission facilities.

**ERROR.** The algebraic difference between the indicated value and the true value.

**EUROPEAN NORM (EN).** A standard that has been adopted by the countries of the European Union.

**-F-**

**FAILURE.** The event, or inoperable state, in which any item or part of an item does not, or would not, perform as previously specified.

**-G-**

**GRAPHICAL USER INTERFACE (GUI).** A user interface based on graphics (icons, pictures, menus) instead of text; uses a mouse as well as keyboard, as an input device.

**-H-**

**HEATING VENTILATING AND AIR CONDITIONING (HVAC).** Refers to the systems and equipment used to maintain environmental conditions of temperature and humidity within specified ranges.

**HIGH ALTITUDE ELECTROMAGNETIC PULSE (HEMP).** A strong electromagnetic field of short duration produced by detonation of a nuclear warhead in the atmosphere.

**HUMAN-MACHINE INTERFACE (HMI).** Human-machine interface between user and terminal system that consists of a physical section and a logical section dealing with functional operation states.

**-I-**

**INHERENT AVAILABILITY ( $A_i$ ).** A measure of availability that includes only the effects of an item design and its application, and does not account for effects of the operational and support environment.

**INHERENT AVAILABILITY ( $A_i$ ).** A measure of availability that includes only the effects of an item design and its application, and does not account for effects of the operational and support environment. Sometimes referred to as "intrinsic" availability.

**INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS (IEEE).** An international professional organization of electrical and electronics engineers which develops standards and recommended practices for the design, operation and maintenance of facility electrical systems.

**INSTRUMENTATION, SYSTEMS AND AUTOMATION SOCIETY (ISA).** A professional organization that develops standards for the design and documentation of control and automation systems.

**-L-**

**LOCAL AREA NETWORK (LAN).** A network operated within a single facility or group of facilities in close physical proximity.

**-M-**

**MEAN DOWN TIME (MDT).** The average time a system is unavailable for use due to maintenance.

**MEAN TIME BETWEEN FAILURE (MTBF).** A basic measure of reliability for repairable items. The mean number of life units during which all parts of the item perform within their specified limits, during a particular measurement interval under stated conditions.

**MEAN TIME BETWEEN MAINTENANCE.** The mean time between all maintenance activities.

**MEAN TIME TO REPAIR (MTTR).** A basic measure of maintainability. The sum of corrective maintenance times at any specific level of repair, divided by the total number of failures within an item repaired at that level, during a particular interval under stated conditions.

**-N-**

**NATIONAL FIRE PROTECTION ASSOCIATION (NFPA).** A codes and standards producing organization concerned with protection of life and property. Commonly used NFPA standards include 101-Life Safety Code, and 70-National Electrical Code.

**NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY (NIST).** An organization that establishes and maintains standard quantities used for calibration of measurement devices.

**NETWORK.** A system, typically using physical transmission media, to allow communication between multiple electronic devices.

**-P-**

**PACKET.** A group of data assembled for transmission on a network.

**P CONTROLLER.** A controller having only proportional control action (see paragraph 2-4).

**PREVENTIVE MAINTENANCE.** The practice of periodically performing maintenance activities on a system or equipment with the intended purpose of preventing unscheduled outages of the equipment due to component failure.

**PI CONTROLLER.** A controller having proportional and integral control action (See paragraph 2-4).

**PID CONTROLLER.** A controller having proportional, integral and derivative control action (see paragraph 2-4).

**POINT.** A single variable within a control system. This term usually refers to the inputs and outputs of the system, but can also be applied to variables that exist only within the internal logic of the processor, which may be called virtual points or control points.

**POINTS LIST.** A tabulation of all the system points that includes relevant data for each point. See Appendix D-1.

**PROCESS VARIABLE.** The quantity in a process or system that is to be controlled to a desired value.

**PROGRAMMABLE LOGIC CONTROLLER (PLC).** A microprocessor based controller capable of accepting input signals, performing pre-programmed digital control logic or analog control action, and providing output signals.

**PROTOCOL.** A set of rules for assembling and transmitting data over a network.

**-R-**

**RADIO FREQUENCY INTERFERENCE (RFI).** Electromagnetic radiation which is emitted by electrical circuits carrying rapidly changing signals, as a by-product of their normal operation and which causes unwanted signals (interference or noise) to be induced in other circuits.

**RANDOM ACCESS MEMORY (RAM).** The most common computer memory which can be used by programs to perform necessary tasks while the computer is on; an integrated circuit memory chip allows information to be stored or accessed in any order and all storage locations are equally accessible.

**REDUNDANCY.** The existence of more than one means for accomplishing a given function. Each means of accomplishing the function need not necessarily be identical.

- a. **N+X Redundancy:** N is the number of units required to meet the load. X additional (redundant) units are provided for a total quantity of N+X units. Common configurations are N+1 and N+2.
- b. **X times N or XN Redundancy:** N is the number of units required to meet the load. The total number of units installed is a multiple X of that number. A common configuration is 2N.

**RELIABILITY.** (1) The duration or probability of failure-free performance under stated conditions. (2) The probability that an item can perform its intended function for a specified interval under stated conditions.

**RELIABILITY-CENTERED MAINTENANCE (RCM).** A disciplined logic or methodology used to identify preventive and corrective maintenance tasks to realize the inherent reliability of equipment at a minimum expenditure of resources.

**RESISTANCE TEMPERATURE DETECTOR (RTD).** A device whose electrical resistance varies predictably with temperature, used as a temperature sensor in automatic control systems.

### -S-

**SELECT-BEFORE-OPERATE.** Refers to a program requirement that a particular device, such as a valve, to be controlled be selected by pointing at and clicking on a screen icon or other means before an operation such as open or close may be selected to apply to that device. This reduces errors by requiring a two-step process for manual control.

**SENSOR.** See transducer.

**SHIELDED TWISTED PAIR (STP).** A cable construction consisting of two copper conductors, twisted together to reduce inductive coupling and covered with an electrically continuous metallic foil or tape shield to reduce capacitive coupling.

**SUPERVISORY CONTROL AND DATA ACQUISITION (SCADA).** An electronic system that provides for monitoring and controlling systems or processes remotely.

### -T-

**TRANSDUCER.** An element or device which receives information in the form of one quantity and converts it to information in the form of the same or a different quantity.

**TRANSMITTER.** A transducer which responds to a measured variable by means of a sensing element, and converts it to a standardized transmission signal which is a function of only the measured variable.

**TRANSIENT VOLTAGE SURGE SUPPRESSION (TVSS).** A protective device for limiting transient voltages by diverting or limiting surge current; it also prevents continued flow of follow current while remaining capable of repeating these functions.

### -U-

**UNINTERRUPTIBLE POWER SUPPLY (UPS).** A device that is inserted between a primary source and the primary power input of equipment to be protected for the purpose of eliminating the effects of transient anomalies or temporary outages.

**UNSHIELDED TWISTED PAIR (UTP).** A cable construction consisting of two copper conductors, twisted together to reduce inductive coupling.

**-V-**

**VARIABLE FREQUENCY DRIVE (VFD).** A device which allows the speed of an electric motor to be controlled by varying the frequency of alternating current (AC) voltage applied to the motor.

**VOLTS PER CELL (VPC).** The chemical voltage of a battery produced by a single electrochemical cell. The total voltage of a battery is the VPC times the number of cells connected in series.

**-W-**

**WIDE AREA NETWORK (WAN).** A network operated between facilities separated by large distances.

**WINDOWS.** A common personal computer operating system, produced and marketed by Microsoft Corporation.